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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/557,108	04/24/2000	Jiang Hsieh	15-CT-5344	8980

7590

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EXAMINER

KIM, CHONG R

ART UNIT

PAPER NUMBER

2623

DATE MAILED: 01/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/557,108

Applicant(s)

HSIEH, JIANG

Examiner

Charles Kim

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 9, 11-13, 15-21, 23 and 25-27 is/are rejected.
- 7) ☒ Claim(s) 8, 10, 14, 22, 24 and 28 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 April 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claim 1 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 09/429,867. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of the instant application covers equivalent subject matter and is merely a broader recitation of claim 1 of the copending application.

Claim 1 of the instant application discloses the step of "helically scanning the object with a multi-slice CT imaging system to acquire attenuation measurements of the object" in lines 3-4, which corresponds to "helically scanning an object with multi-slice CT imaging system to obtain data segments including peripheral data segments" in lines

4-5 of claim 1 in the copending application. It is noted that attenuation measurements are inherent in all helical scanning systems.

Claim 1 of the instant application further recites “the measurements including more than two conjugate samples for estimation of a projection at a plane of reconstruction of the object” in lines 4-6, which corresponds to the “data segments including peripheral data segments” which is utilized to “form a data set for reconstruction of an image slice” in lines 5-7 of the copending application.

Claim 1 of the instant application further recites “filtering and backprojecting the attenuation measurements of the object, including the more than two conjugate samples, to reconstruct at least one image slice of the object” in lines 7-9. Claim 1 of the copending application discloses the step of “reconstructing the combined data into image slices” in line 8, but does not include filtering and backprojecting. Official notice is taken that filtering and backprojecting was exceedingly well known in all scanning systems for reconstructing an image slice from a set of projections. Therefore it would have been obvious to include filtering and backprojecting in the reconstructing step of claim 1 of the copending application in order to accurately reconstruct the image slices.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-5, 9, 11, 15-19, 23, 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Taguchi (U.S. Patent No. 5,974,108).

Referring to claim 1, Taguchi discloses a method for imaging an object with a computed tomographic imaging system, comprising the steps of:

a. helically scanning the object with a multi-slice CT imaging system to acquire attenuation measurements of the object, the measurements including more than two conjugate samples for estimation of a projection at a plane of reconstruction of the object (col. 4, line 61 to col. 5, line 9. Note that the "groups of real data" in col. 5, line 6 is interpreted as being analogous to more than two conjugate samples; since two data samples are selected from the group, see col. 5, lines 4-6)

b. filtering and backprojecting the attenuation measurements of the object, including the more than two conjugate samples, to reconstruct at least one image slice of the object [col. 25, lines 1-12 and col. 26, lines 19-21. Note that the filtering is performed in the interpolator (29) and the backprojecting is performed in the image reconstructor (31) of figure 11].

Referring to claim 2, Taguchi further discloses that the more than two conjugate samples are located within a predetermined distance from the plane of reconstruction of the object [col. 2, lines 23-29. Note that the "target slicing location" in line 27 is

interpreted to mean the plane of reconstruction, since the image is produced at that location, col. 6, lines 28-30. It is also noted that the samples (arrows) are located within a predetermined distance from the plane of reconstruction (target slicing location) in figure 4B].

Referring to claim 3, Taguchi further discloses that the CT imaging system has N detector rows (col. 14, line 66), and further comprises the step of selecting a helical pitch $P:1$ for the helical scan, where P is a non-integer less than N (col. 15, line 33. Note that $N=4$ and a helical pitch of 2.5 is selected).

Referring to claim 4, Taguchi further discloses that $N=4$ and $P=2.5$ (col. 14, line 66 and col. 15, line 33 and figure 26).

Referring to claim 5, Taguchi further discloses a step of applying a non-linear interpolation to the attenuation measurements prior to the filtering and backprojecting (col. 24, lines 34-45 and figure 45).

Referring to claim 9, Taguchi further discloses that applying a non-linear interpolation to the attenuation measurements comprises combining weighted interpolated measurements with weighted extrapolated measurements (col. 11, lines 20-28 and col. 12, lines 12-20).

Referring to claim 11, Taguchi further discloses the step of applying a set of weights to the attenuation measurements prior to the filtering and backprojecting (col. 10, lines 45-57. Note that the weights are applied as the interpolation proceeds in lines 45-46, and is therefore applied prior to the filtering and backprojecting; since the interpolation is applied prior to the filtering and backprojecting as disclosed above).

Claims 15-19, 23, 25 recite a system that corresponds to the method of claims 1-5, 9, 11. Arguments analogous to those presented above with respect to claims 1-5, 9, 11 are applicable to claims 15-19, 23, 25. The system for performing Taguchi's method is inherent in his teaching.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 6-7, 12-13, 20-21, 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taguchi (U.S. Patent No. 5,974,108), further in view of Berlad (U.S. Patent No. 5,513,120).

Referring to claim 6, Taguchi fails to teach applying a Lagrange interpolation.

Berlad teaches a step of applying a Lagrange interpolation to a radiation image (col. 4, lines 1-19).

Taguchi and Berlad are both concerned with reconstructing radiation images by backprojection. Berlad's method provides an interpolated image where the texture of the image does not vary as a function of location and the signal content and signal-to-noise ratio are substantially the same after the interpolation (Berlad, col. 2, lines 16-29).

Therefore, it would have been obvious to modify the interpolation of Taguchi so that it is a Lagrange interpolation, as taught by Berlad.

Referring to claim 7, Taguchi teaches applying a non-linear interpolation to the attenuation measurements from four detector rows (col. 14, line 66 and col. 24, lines 34-45). Taguchi fails to teach applying a third order Lagrange interpolation weights to the measurements.

Berlad teaches the step of applying third order Lagrange interpolation weights to a radiation image (col. 4, lines 48-50. Note that the “four interpolation coefficients as derived from a four point cubic Lagrange polynomial” in lines 48-50 is interpreted to mean third order Lagrange interpolation weights).

Taguchi and Berlad are both concerned with reconstructing radiation images by backprojection. Berlad’s method provides an interpolated image where the texture of the image does not vary as a function of location and the signal content and signal-to-noise ratio are substantially the same after the interpolation (Berlad, col. 2, lines 16-29). Therefore, it would have been obvious to modify the interpolation applying step of Taguchi, so that it applies third order Lagrange interpolation weights, as taught by Berlad.

Referring to claim 12, Taguchi fails to teach the step of applying Lagrange weights to the attenuation measurements.

Berlad teaches the step of applying Lagrange weights to a radiation image (col. 48-50. Note that the “four interpolation coefficients” in line 48 is interpreted to mean Lagrange weights).

Taguchi and Berlad are both concerned with reconstructing radiation images by backprojection. Berlad’s method provides an interpolated image where the texture of the

image does not vary as a function of location and the signal content and signal-to-noise ratio are substantially the same after the interpolation (Berlad, col. 2, lines 16-29).

Therefore, it would have been obvious to modify the set of weights of Taguchi, so that they are Lagrange weights, as taught by Berlad.

Referring to claim 13, see the rejection of at least claim 7 above.

Claims 20-21, 26-27 recite a system that corresponds to the method of claims 6-7, 12-13. Arguments analogous to those presented above with respect to claims 6-7, 12-13 are applicable to claims 20-21, 26-27. The system for performing Taguchi and Berlad's method is inherent in their teaching.

Allowable Subject Matter

5. Claims 8, 10, 14, 22, 24, and 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Lai U.S. Patent No. 5,946,371 teaches a fourth order Lagrange interpolation in col. 19, lines 1-16.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Kim whose telephone number is 703-306-4038. The examiner can normally be reached on Monday thru Thursday 8:30am to 6:00pm and alternating Fridays 9:30am to 6:00pm.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703-308-6604. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-0377.

ck

ck

January 11, 2003


Jon Chang
Primary Examiner